

We claim:

1. An information processor to analyze the right of access to a database having a data file in a form of a structured document, the information processor comprising:
  - 5 a query automaton generation unit for generating a query automaton from a path expression in which a retrieval condition for the database is described;  
an access control automaton generation unit for generating an access control automaton from an access control policy in which an access control rule is described; and  
a logic operation unit for deciding access rights in database retrieval using the path  
10 expression by performing logic operations related to the query automaton generated by the query automaton generation unit and the access control automaton generated by the access control automaton generation unit.
2. The information processor of claim 1, further comprising a schema automaton  
15 generation unit for generating a schema automaton from a schema showing a structure of the data file stored in the database wherein the logic operation unit performs decision of the access right in consideration for the schema automaton generated by the schema automaton generation unit.
- 20 3. The information processor of claim 2, further comprising a path table control unit for controlling path table describing paths of the data file stored in the database wherein the schema automaton generation unit generates the schema automaton from the path table controlled by the path table control unit.
- 25 4. The information processor of claim 1, further comprising a path expression

extraction unit for extracting the path expressions from a query expression specifying a retrieval method for the database.

5. The information processor of claim 4, further comprising a query expression  
5 access right decision unit for deciding access rights in the database retrieval by the query expression based on decision results of access rights, which are obtained by the logic operation unit, for the individual path expressions extracted from the query expression.

6. An information processor which analyzes access rights to a database having a data  
10 file comprising a structured document, the information processor comprising:

a path table control unit for controlling a path table describing paths of a data file stored in the database; and

an access right decision unit for selecting a predetermined path in the path table controlled by the path table control unit by a path expression describing a retrieval  
15 condition for the database, applying an access control policy describing access control rules and deciding an access right in database retrieval by the path expression with respect to the predetermined path.

7. The information processor of claim 6, further comprising:

20 a query automaton generation unit for generating a query automaton from a path expression in which a retrieval condition for the database is described; and

an access control automaton generation unit for generating an access control automaton from the access control policy in which the access control rule is described,

wherein the access right decision unit selects the predetermined path by use of the  
25 query automaton generated by the query automaton generation unit and decides an access

right to the predetermined path by use of the access control automaton generated by the access control automaton generation unit.

8. The information processor of claim 6, further comprising a path expression  
5 extraction unit for extracting the path expressions from a query expression specifying a retrieval method for the database.

9. The information processor of claim 8, further comprising a query expression  
10 access right decision unit for deciding access rights in the database retrieval by the query expression based on decision results of access rights, which are obtained by the access right decision unit, for the individual path expressions extracted from the query expression.

10. A database retrieval system, comprising:  
15 a database storing an XML document; and  
an access rights analysis device which decides, based on path expressions describing retrieval conditions used in retrieval for the database and an access control policy describing access control rules, to which one of

- 20 1) always permitted,  
2) always denied, and  
3) indeterminate

an access right in the database retrieval using the path expressions corresponds.

11. The database retrieval system of claim 10, wherein the access rights analysis  
25 device includes

a query automaton generation unit for generating a query automaton from a path expression in which a retrieval condition for the database is described,

an access control automaton generation unit for generating an access control automaton from the access control policy in which an access control rule is described and

5 a logic operation unit for deciding access rights in database retrieval using the path expression by performing logic operations related to the query automaton generated by the query automaton generation unit and the access control automaton generated by the access control automaton generation unit.

10 12. The database retrieval system of claim 11, further comprising :

a path expression extraction unit for extracting the path expressions from a query expression specifying a retrieval method for the database; and

15 a query expression access right decision unit for deciding access rights in the database retrieval by the query expression based on decision results of access rights, which are obtained by the logic operation unit, for the individual path expressions extracted from the query expression.

13. The database retrieval system of claim 10, further comprising the access rights analysis device including:

20 a path table control unit for controlling a path table describing paths of a data file stored in the database; and

an access right decision unit for selecting a predetermined path in the path table controlled by the path table control unit by a path expression describing a retrieval condition for the database, applying the access control policy describing the access control rules and deciding an access right in database retrieval by the path expression with respect

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to the predetermined path.

14. The database retrieval system of claim 13, further comprising:

a path expression extraction unit for extracting the path expressions from a query  
5 expression specifying a retrieval method for the database; and

a query expression access right decision unit for deciding access rights in the  
database retrieval by the query expression based on decision results of access rights,  
which are obtained by the access right decision unit, for the individual path expressions  
extracted from the query expression.

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15. An access rights analysis method for analyzing the right of access to a database  
storing an XML document by use of a computer, comprising the steps of:

generating a query automaton from a path expression in which a retrieval  
condition for the database is described, generating an access control automaton from an  
15 access control policy in which an access control rule is described and storing the generated  
query automaton and access control automaton in a predetermined storage means; and

performing logic operations related to the query automaton and the access control  
automaton, which are stored in the predetermined storage means, and deciding an access  
right in database retrieval using the path expression without checking the XML documents  
20 stored in the database.

16. An access rights analysis method for analyzing the right of access to a database  
storing an XML document by use of a computer, comprising the steps of:

selecting a predetermined path from a path table, which is stored in s  
25 predetermined storage means and describes paths of a data file stored in the database, by a

path expression describing a retrieval condition for the database; and

applying an access control policy describing access control rules and, without checking the data file stored in the database, deciding an access right in database retrieval by the path expression with respect to the predetermined path.

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17. A program for analyzing the right of access to a database handling a data file as a structured document, by controlling a computer, the program causing the computer to function as:

10 a query automaton generation means for generating a query automaton from a path expression in which a retrieval condition for the database is described;

an access control automaton generation means for generating an access control automaton from an access control policy in which an access control rule is described; and

15 a logic operation means for deciding access rights in database retrieval using the path expression by performing logic operations related to the generated query automaton and access control automaton.

18. The program of claim 17, further causing the computer to function as

a path expression extraction means for extracting the path expressions from a query expression specifying a retrieval method for the database; and

20 a query expression access right decision means for deciding access rights in the database retrieval by the query expression based on decision results of access rights for the individual path expressions extracted from the query expression.

25 19. A program for analyzing the right of access to a database handling a data file, described in a form of a structured document, by controlling a computer, the program

allowing the computer to function as:

a path table control means for controlling a path table describing paths of a data file stored in the database; and

5 an access right decision means for selecting a predetermined path in the path table controlled by the path table control unit by a path expression describing a retrieval condition for the database, applying an access control policy describing access control rules and deciding the presence of an access right in database retrieval by the path expression with respect to the predetermined path.

10 20. The program of claim 19, further causing the computer to function as:

a path expression extraction means for extracting the path expressions from a query expression specifying a retrieval method for the database; and

15 a query expression access right decision means for deciding access rights in the database retrieval by the query expression based on decision results of access rights for the individual path expressions extracted from the query expression.